F. H. STOLTZE LAND & LUMBER CO

"Water Supply Assessment "

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What water supply problems are you currently experiencing?

A. Irrigation
B. Population vs. Residential
C. Appropriations vs. Mean Monthly Flow

A: IRRIGATION

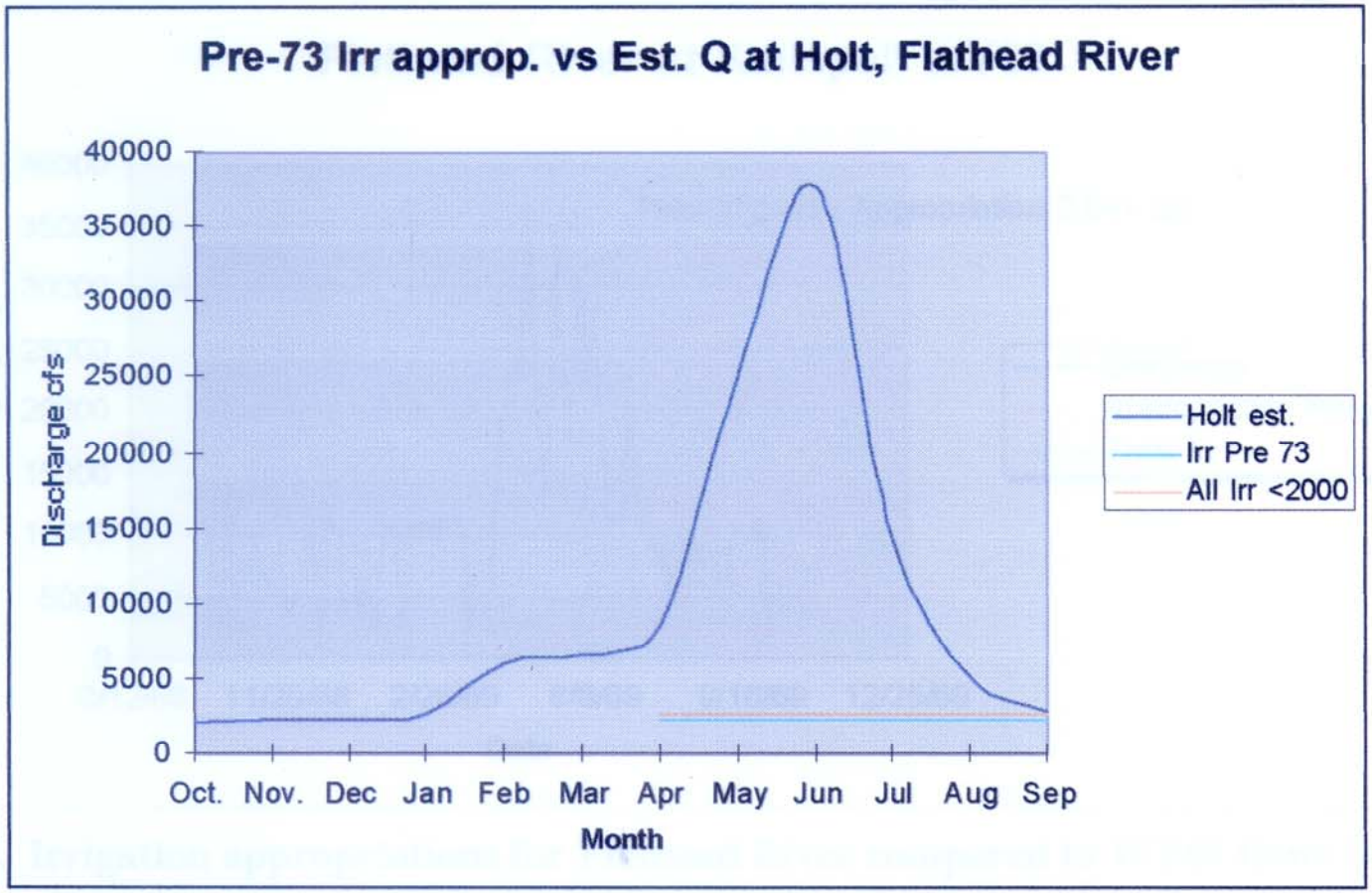

Figure 4. Irrigation Appropriations (76LJ) for Pre-73 and <2000 compared to estimated mean monthly discharge at Holt (head of Flathead Lake).

Source: Upper Flathead Basin Preliminary Water Use Study, Flathead County, MT.

RLK Hydro, November 25, 2002

B: Population vs. Residential

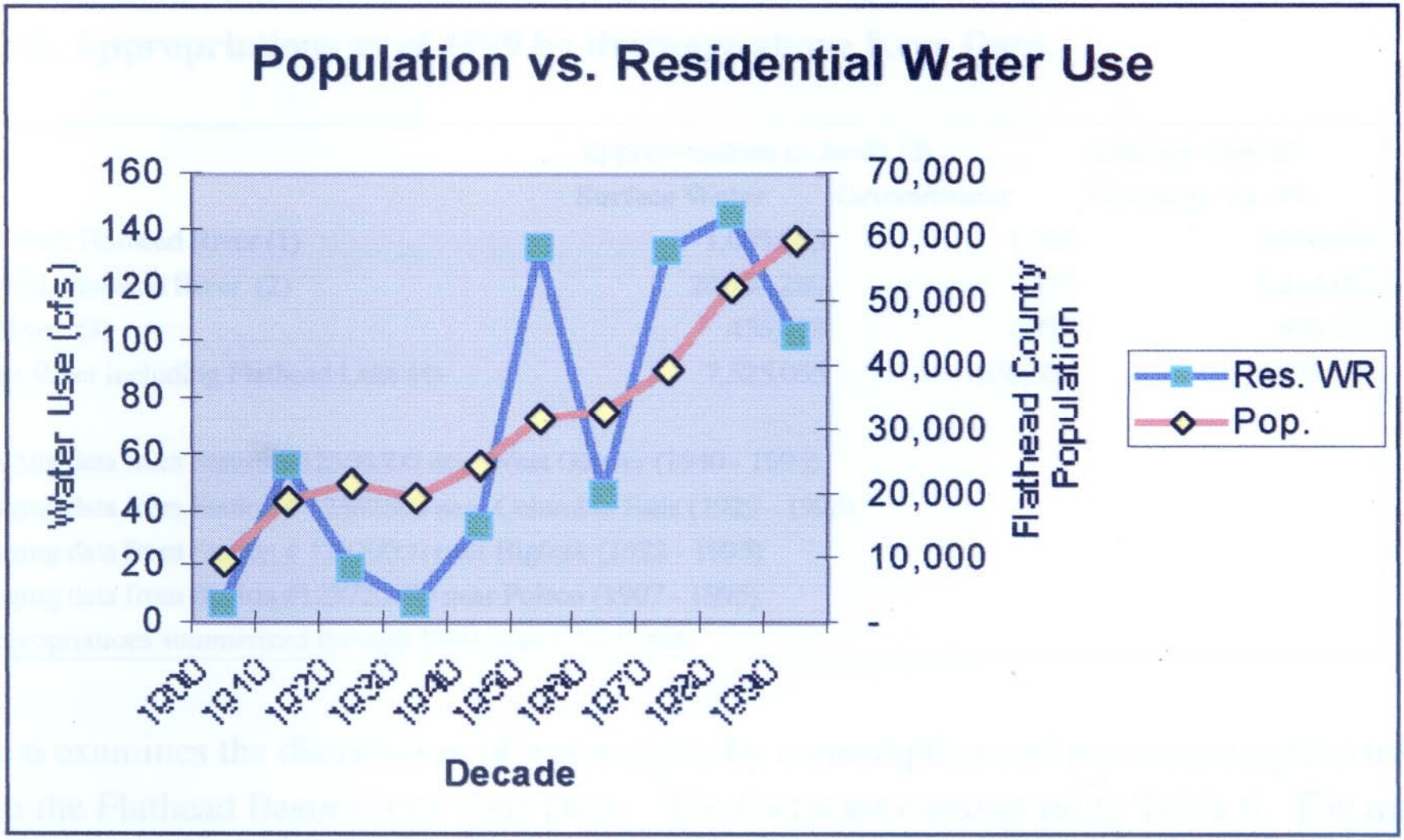

Figure 8. Domestic water use in 76LJ compared to Flathead County population.

Source: Upper Flathead Basin Preliminary Water Use Study, Flathead County, MT.

C: Appropriations vs. Mean Monthly Flow

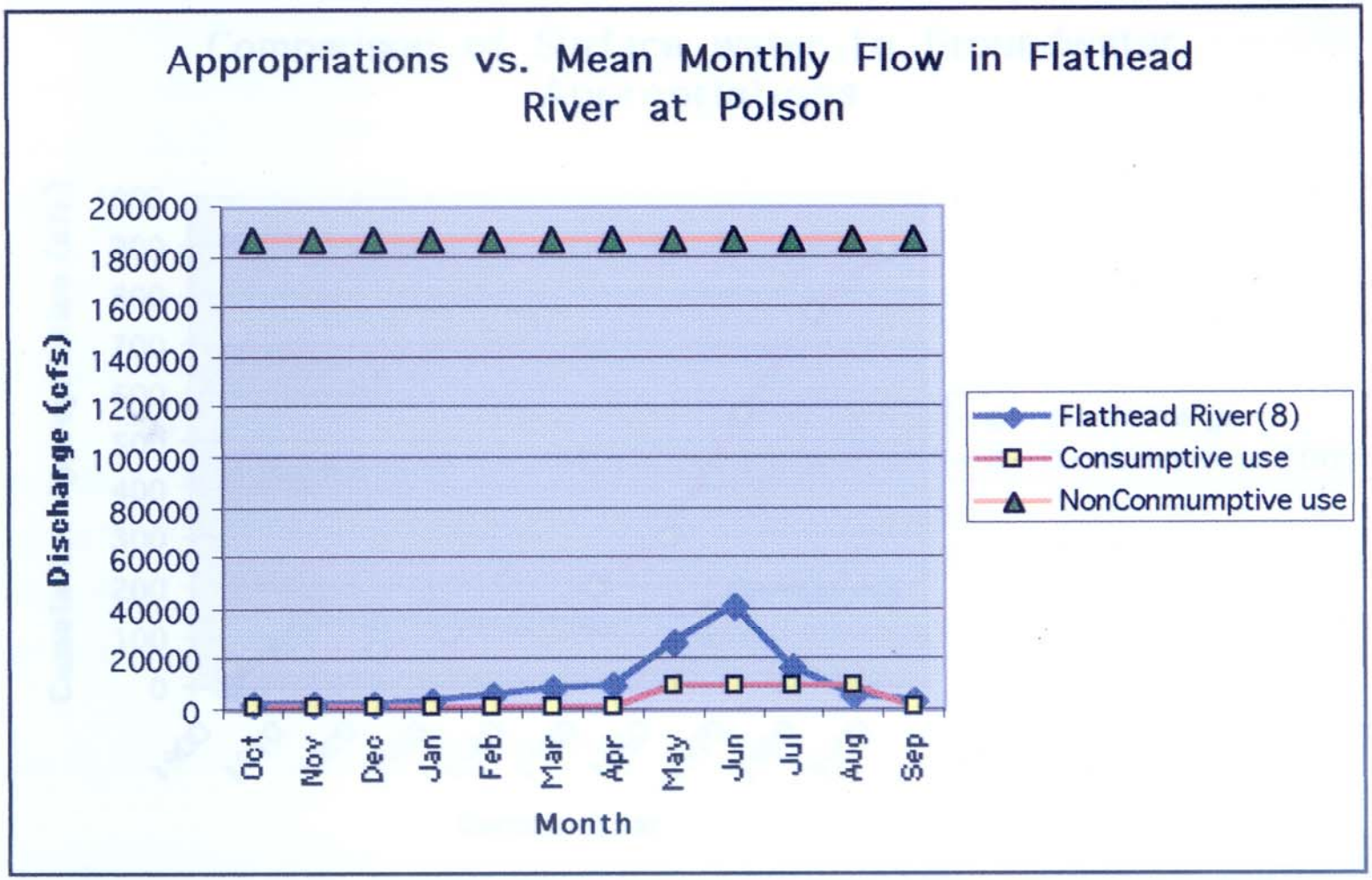

Figure 12. Appropriations in Flathead River and Flathead Lake compared to mean monthly flows near Polson.

Source: Upper Flathead Basin Preliminary Water Use Study, Flathead County, MT.

Current Conditions

- Unallocated water exists in all four basins in the Flathead.
- Increase appropriations with increase in population.
  - City of Kalispell, 30% consumptive use
- Correlation between allocated and actual is unknown.
  - We do know that Avista water right exceeds Flathead Flow except for a few days each year.
- Domestic appropriations are about 2 times that of agriculture. (in 2000)
- Allocations dramatically increased after 1970.

What water supply problems do you foresee over the next 50 years?

A. Agricultural irrigation will decrease while recreational irrigation will increase.
B. Domestic use will increase
C. Vegetation use.

How Many Gallons of Water to Create 1 pound of wood?

A. 200,000 gallons?
B. 100,000 gallons?
C. 50,000 gallons?
D. 10,000 gallons?

ANSWER

90,000 LBS OF WATER!

10,843 GALLONS

TO MAKE ONE POUND OF WOOD.

Waddell Valley watershed in Northern California

- 25 sq. miles
- Clearcut and burned in 1900
- 1930 began to recover
- 2000 fully revegetated
- Mean dry season discharge corrected for rainfall is a ***fraction*** of what it was in 1930
- Similar results were found in Massachusetts in Quabbin Reservoir Watershed.

Other Interesting Facts

- A medium sized tree (40-50 feet tall) will take 10,000 gallons (83,000 lbs) of water from the soil in a growing season.
- A tree uses 55 lbs of water to make 100 pounds of cellulose, the main constituent of wood, but it evaporates more than 90,000 pounds of water in the process.
- A study done by the Baltimore City Watershed wherein young pine trees were planted on a bare watershed the annual surface water was reduced by 283,000 gallons per acre per year (which is equivalent to 13.3 inches of precipitation per year).
- Ecologists report that the anadromous fish habitat improves almost *linearly* with stream flow up to the level limited by the overflow of the stream banks.

How to address these problems

A. Population increases
   - Encourage all types of conservation from initial use to recycling.

B. With less agriculture, we will see more water for a ***short*** period of time.

C. Use by vegetation
   - Management of forests with control of stocking.